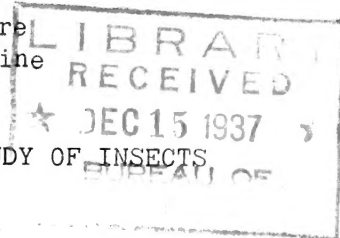


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AN APPARATUS FOR ALL-SEASON SAMPLING FOR THE STUDY OF INSECTS

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In conducting studies of the life history of the beet leafhopper, Eutettix tenellus (Bak.), and the seasonal occurrence of associated species of arthropods, it was essential to continue sampling operations during cold weather when the different species were inactive and could not be collected by the usual methods. The equipment described herein was designed to permit sampling during the winter and under all weather conditions.

Details of the equipment used are illustrated in figure 1. The sampling cage (fig. 1, C) consisted of a cylinder of automobile celluloid, capped with fine-meshed cloth, and fastened to a sheet-metal base used as a sleeve for insertion within the cutting die (fig. 1, B). The top part of the cage was attached to the metal base by means of a piece of felt weather stripping and an adjustable metal band. The weather strip was folded around the edge of the celluloid and was sewed in place to form a pad about 1 inch wide on both inner and outer surfaces. In this way the top was made to fit snugly over the base and was held in place by a metal band and overshoe buckle, as was used by Wallis (ET-48, 1935). The top of the cage was closed by tacking the cloth and celluloid to a wooden ring (cut with a band saw) that was used to strengthen the cage and make it more rigid (fig. 1, C).

The die was made of a 6-inch section of thin-walled steel pipe about $8\frac{1}{2}$ inches in diameter and included about one-third of a square foot of soil-surface area. A section of saw blade was attached by welding to form a toothed edge for cutting through frozen soil.

Samples were taken at different positions in the observation plot (determined by method of random selection) by throwing down the die and attached cage by means of the pitchfork handle. A different cage was used for each sample and was removed from the die with the contained insects, soil, and plants, after the sampling operation was completed. In removing the samples,

1/ The writers are indebted to J. R. Douglass for suggesting several improvements in the equipment described.

the die was forced into the soil to a depth of about 5 inches by means of a rotary motion imparted by moving the handle backward and forward while applying downward pressure. During the winter and at other times when the soil was moist, the samples could usually be taken by lifting the die. At other times it was necessary to remove soil from the side with a trowel and to insert and hold a circular metal plate beneath the sample while the cage and contained core of soil were removed. Removal of the samples was facilitated by a small stand with a circular metal top (slightly smaller than the die in diameter) that was used to support the samples while the die was slipped down and off the base of the cage.

The samples were then placed in a delivery truck and brought to the laboratory for examination under a desk light. During the warmer seasons when the insects were active in the field, most of them were removed immediately through a small hole in the side of the cage by means of a suction tube, after which the top was removed from the metal base and the debris and surface soil was examined closely for the remainder. The samples were then watered like potted plants, to prevent wilting, and incubated at a favorable temperature to permit hatching of the eggs contained in the plants so that the number of eggs present on the date of sampling could be ascertained. In cold weather, when the insects were inactive in the field, the samples were placed immediately in a warm room and were examined after the insects had become active.

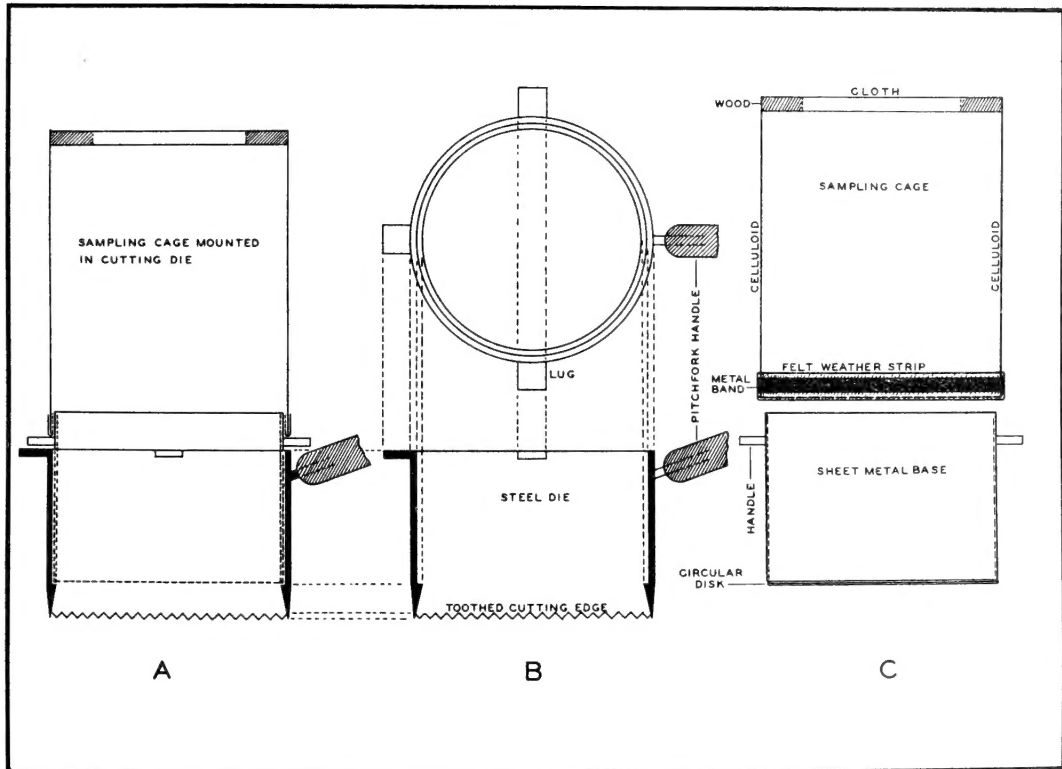


Figure 1.--A. Cage mounted in die in position for taking sample.
 B. Detail of die showing lugs for applying pressure and toothed edge for cutting through frozen soil.
 C. Detail of cage showing attachment to metal base by a felt pad and an adjustable metal band.

